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TWO NEBULÆ WITH LARGE RADIAL VELOCITIES.

In the course of the determination of the radial velocities of a number of nebulæ at Mount Hamilton, two planetaries in addition to those announced in Number 151 of these *Publications* have been found to have large velocities in the line of sight. They are: N. G. C. 6644 ($\alpha = 18^h 26^m.4$; $\delta = -25^\circ 12'$), for which the mean of the measures of four spectrograms by Miss HOBE, Messrs. SELGA, S. J., and MOORE gives $+190.9^{km}$ and Second Index N. G. C. 4732 ($\alpha = 18^h 27^m.9$; $\delta = -22^\circ 43'$), for which the mean of four spectrograms measured by the above observers is -147.7^{km} . The radial velocity corrected for the solar motion is therefore for the first nebula $+202^{km}$, and for the second -136^{km} per second.

J. H. MOORE.

PERSONAL NOTE.

The degree of Doctor of Philosophy in Astronomy, Mathematics and Physics was conferred on Mr. DANIEL WALTER MOREHOUSE, B. S., Drake University, 1900 and M. S., Drake University, 1902, at the annual commencement of the University of California on May 13, 1914.

Mr. MOREHOUSE holds the chair of physics and astronomy in Drake University. He has pursued graduate work in the Universities of Chicago and California, including theoretical work at Chicago and Berkeley and practical work at the Yerkes and Lick Observatories. He completed his studies for the degree in the University of California during the academic year 1911-12, while on leave of absence from Drake University and was awarded his degree upon submitting a thesis on the "Orbit of the Seventh Satellite of *Jupiter*," of which the following is an abstract:—

The original determination of the elements of the orbit of the seventh satellite of *Jupiter* presented an unusually difficult problem—designated almost impossible by some investigators—on account of the large and irregular solar perturbations during the time from January 3 to March 6, 1905, over which the discovery observations extended. Solutions, which took account of the perturbations, were accomplished by Dr. F. E. ROSS by a general satellite theory and by Dr. R. T. CRAWFORD and Mr. A. J. CHAMPREUX by LEUSCHNER's method of direct solution of orbits of disturbed bodies.

Both solutions require improvement, the former, although later extended by Ross to represent 12 observations distributed uniformly from January 3, 1905, to September 25, 1906, because the satellite theory was based on approximate osculating elements and confined to the principal terms; the latter because of the shortness of the arc from which the preliminary osculating elements were deduced.

The author undertook the task of deriving an accurate set of osculating elements by a further application of LEUSCHNER's method, partly for the purpose of testing the advantages of certain closed expressions, partly in order to test the accuracy of certain directions for taking full account of the aberration, and, finally, in order to provide a set of osculating elements of sufficient accuracy to serve as the basis of any future rigid satellite theory.

The plan of work involved an extension of the special perturbations and differential corrections on the basis of increased arcs of the preliminary elements computed by CRAWFORD and CHAMPREUX; the revision of the perturbations from the date of discovery at the original eight-day intervals on the basis of the corrected elements, and ultimately with even shorter intervals; and a repeated representation of the available positions for the purpose of eliminating defective observational material.

The investigation is not concluded, but the first two objects: the proof of the advantages of LEUSCHNER's closed expressions for correcting satellite orbits and of the accuracy of the directions for taking full account of the aberration, have been attained, while another revision of the special perturbations with a subsequent differential correction of the elements should give an orbit representing the available positions within the errors of observation.

A. O. LEUSCHNER.

VOLUME XI, PUBLICATIONS OF THE LICK OBSERVATORY.

This volume, entitled "Photographs of the Milky Way and of Comets, made with the Six-Inch Lens and Crocker Telescope during the Years 1892 to 1895 by E. E. BARNARD," has just been distributed to the correspondents of the Lick Observatory in the United States, Canada and Mexico. The distribution to European and other foreign correspondents is delayed by the war. The volume contains reproductions, by the collotype process, of eighty-eight photographs of the Milky Way, and thirty-nine photographs of comets; also a plate of lunar photographs, one of the solar corona of January 1, 1889, and one showing the Crocker dome and the Crocker telescope with the Willard lens. In addition to the descriptions of the